

HAND DELIVERED

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DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action  
Environmental Indicator (EI) RCRIS code (CA725)

UTAH DIVISION OF  
SOLID & HAZARDOUS WASTE

Current Human Exposures Under Control

Facility Name: Western Zirconium  
Facility Address: 10,000 West 900 South Ogden, Utah 84404  
Facility EPA ID #: UTD092024934

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?  
☒ X If yes - check here and continue with #2 below.  
☐ If no - re-evaluate existing data, or  
☐ if data are not available skip to #6 and enter "IN" (more information needed) status code.

**BACKGROUND**

**Definition of Environmental Indicators (for the RCRA Corrective Action)**

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

**Definition of "Current Human Exposures Under Control" EI**

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

**Relationship of EI to Final Remedies**

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

**Duration / Applicability of EI Determinations**

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

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2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be “contaminated”<sup>1</sup> above appropriately protective risk-based “levels” (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale / Key Contaminants
Groundwater	<u>X</u>	___	___	<u>See WZ Human Health Risk Assessment</u>
Air (indoors) <sup>2</sup>	___	<u>X</u>	___	<u>Based on knowledge of SWMUs &amp; AOCs</u>
Surface Soil (e.g., <2 ft)	<u>X</u>	___	___	<u>Evaporation Ponds are surface Waters</u>
Surface Water	<u>X</u>	___	___	<u>Risk assessment Tables 1 &amp; 2</u>
Sediment	<u>X</u>	___	___	<u>Tables 1 &amp; 2, and EI Evaluation Table</u>
Subsurf. Soil (e.g., >2 ft)	<u>X</u>	___	___	<u>Tables 1 &amp; 2 and EI Evaluation Table</u>
Air (outdoors)	<u>X</u>	___	___	<u>See WZ Human Health Risk Assessment</u>

\_\_\_\_\_ If no (for all media) - skip to #6, and enter “YE,” status code after providing or citing appropriate “levels,” and referencing sufficient supporting documentation demonstrating that these “levels” are not exceeded.

X\_\_\_\_\_ If yes (for any media) - continue after identifying key contaminants in each “contaminated” medium, citing appropriate “levels” (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

\_\_\_\_\_ If unknown (for any media) - skip to #6 and enter “IN” status code.

**Rationale and Reference(s):**

**Groundwater:** See WZ Human Health Risk Assessment Tables 1 and 2 (URS, May 2005) for information on contaminants for the pond area of the RFI. For the Facility RFI, see the attached EI Evaluation Table.

**Air:** The RFI work has not identified any contamination of air inside of buildings. Also WZ has a program for protecting workers from occupational exposure, no problems of this nature have been identified in that program.

**Outdoor Air:** See WZ Human Health Risk Assessment Tables 1 and 2 (URS, May 2005) for information on contaminants for the pond area of the RFI.

**Surface Soil, Sediment and Subsurface Soil:** For the pond RFI see Risk Assessment Tables 1 and 2. For facility, see EI Evaluation Table.

**Surface water,** see HHRA Tables 1 and 2

**Footnotes:**

<sup>1</sup> “Contamination” and “contaminated” describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based “levels” (for the media, that identify risks within the acceptable risk range).

<sup>2</sup> Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

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3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Potential **Human Receptors** (Under Current Conditions)

<u>Contaminated Media</u>	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food <sup>3</sup>
Groundwater	<u>NO</u>	<u>NO</u>	<u>NO</u>	<u>Yes</u>			<u>NO</u>
Air (indoors)	<u>NA</u>	<u>NA</u>	<u>NA</u>				
Soil (surface, e.g., <2 ft)	<u>NO</u>	<u>Yes</u>	<u>NO</u>	<u>Yes</u>	<u>Yes</u>	<u>NO</u>	<u>NO</u>
Surface Water	<u>NO</u>	<u>Yes</u>			<u>Yes</u>	<u>NO</u>	<u>NO</u>
Sediment	<u>NO</u>	<u>NO</u>			<u>NO</u>	<u>NO</u>	<u>NO</u>
Soil (subsurface e.g., >2 ft)				<u>Yes</u>			
Air (outdoors)	<u>NO</u>	<u>Yes</u>	<u>NO</u>		<u>Yes</u>	<u>NO</u>	

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated") as identified in #2 above.
2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("\_\_\_"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

\_\_\_\_\_ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

  X   If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

\_\_\_\_\_ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and Reference(s):

**Day Care:**

Day Care – There are no day care facilities known to exist within at least 5 to 10 miles of the facility, so it was determined that no credible pathway was available under the day care category.

**Groundwater:**

No residential Groundwater pathways are complete. One resident is about 1 mile away all others are about 5 miles away or greater. No data showing groundwater contamination at or near the resident living 1 mile away.

No worker pathway to groundwater exposure is assumed as the only groundwater pathway seen is from excavation or drilling, this type work would be under the construction category and not the worker category. WZ has no known pathway for exposure of workers to contaminated groundwater.

Construction workers have a potential pathway to exposure of groundwater during excavation activities or drilling activities.

No groundwater pathway to food is seen. No known source of food is supplied from near any of the groundwater contamination areas. Also the background quality of the groundwater is so poor (salty) that it could not be used for food production and no cattle are grazed within the area of groundwater contamination.

**Air (indoor):**

No contamination of indoor air has been identified

**Surface Soil:**

No residential pathway to surface soil is available due to the distances involved to the nearest residents.

A potential pathway for contaminated surface soil to reach workers could be envisioned. Workers occasionally are in the vicinity of some of the SWMU/AOCs listed in the EI Evaluation Table. Incidental inhalation or ingestion could occur during times when a worker may have to pass through or near the areas; however there are no routine worker operations in those areas.

Construction workers may have a potential pathway to surface soil. This pathway would occur if excavation, drilling, dirt moving work, or other construction work occurs within the SWMU/AOC. No current construction work is being completed in these areas.

A potential pathway exists for trespassers and surface soil contamination. See WZ's Human Health risk assessment where this scenario is assessed. This would only occur in very specific areas on the fringe areas of the facility and would not occur within the secure area of the facility.

No potential pathway for exposure of contamination during recreation is seen. No recreation areas are close enough to the facility to complete this pathway. Please note on the recreation pathway that there is some potential for what might be termed vehicles used for recreation (ATVs) to trespass on WZ property creating a possible pathway. For this analysis, the ATV pathway is considered under the trespasser pathway and not the recreation pathway.

There is no credible potential pathway for contaminated surface soil to affect food. This is due to no food being grown even close to any contaminated surface soil.

**Surface Water:**

No residential pathway to surface water is available due to the distances involved to the nearest residents

There is the potential for a pathway to be complete between a worker and surface water. This would be exposure of a worker to WZ's evaporation pond SWMUS or storm water pond SWMU.

This is no routine work for workers to be in contact with the pond water or storm water, but the potential pathway may exist on occasion as workers are in vicinity of these areas. No surface water associated with the facility RFI has been identified per the RBSL described in the EI Evaluation Table.

Trespasser may also have a completed pathway to contaminated surface water due to exposure to the storm water pond. They would not have a pathway to the evaporation ponds due to the security fence in place. See the pond Human Health Risk assessment for more information on this pathway.

No potential pathway for exposure of contamination from surface water during recreation is seen. No recreation areas are close enough to the facility to complete this pathway. The surface water bodies are small shallow areas, boats would not be on the ponds. No swimming is reasonable possible in the storm water pond. Please note on the recreation pathway that there is some potential for what might be termed vehicles used for recreation (ATVs) to trespass on WZ property creating a possible pathway to surface water. For this analysis, the ATV pathway is considered under the trespasser pathway and not the recreation pathway.

No potential pathway is complete for surface water to food. No food is produced even close to surface water in question.

**Sediment:**

No residential pathway to sediment is available due to the distances involved to the nearest residents.

There is a potential pathway for workers and sediment that was considered, but was determined to be not complete. The only contaminated sediment is found in the evaporation pond SMWUs and AOC 15 (storm water ditch). The exposure would be very rare, but may occur if workers complete sampling operations. However the sediment currently remains covered with water and due to the very remote chance for exposure the pathway is listed as incomplete.

There is no complete pathway for sediment and trespassers. Sediment is found only in the evaporation ponds and in the storm water ditch. These areas are secure from trespassers with fences, locks, etc.

There is no complete pathway for sediment and recreation due to the fact that no recreation areas exist that would come in contact with contaminated sediment.

There is no complete pathway for sediment and food due to the fact no food is produced near the facility. Also the sediment is in a secure area.

**Subsurface Soil:**

Construction workers may have a potential pathway to sub surface soil. The SWMU/AOCs with potential subsurface contamination are listed in the EI Evaluation table. This pathway would exist only during excavation, or drilling within the SWMU/AOC. No current construction work is being completed in these areas.

**Outdoor Air:**

There is no reasonable pathway between contaminated outdoor air and residents due to the distances involved between location of potential air contamination and the residents.

The pathway between workers and contaminated outdoor air is a possible complete pathway. Ammonia levels have been modeled for potential ammonia in the air around the ponds. Workers may be at the ponds for this pathway.

There is a potential pathway between trespassers and outdoor air contamination as outlined in the human health risk assessment with potentially contaminated dust in the air where trespassers may enter.

No potential pathway for exposure of outdoor air contamination during recreation is seen. No recreation areas are close enough to the facility to complete this pathway. Please note on the recreation pathway that there is some potential for what might be termed vehicles used for recreation (ATVs) to trespass on WZ property creating a possible pathway. For this analysis, the ATV pathway is considered under the trespasser pathway and not the recreation pathway.

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<sup>3</sup> Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

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- 4 Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**<sup>4</sup> (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

  X   If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

\_\_\_\_\_ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

\_\_\_\_\_ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

**Rationale and Reference(s):**

Nine items from question 3 were marked as yes for a complete pathway. Each item is discussed below as to the significance:

1. Exposure of construction workers to ground water. This exposure is not considered significant due to the following factors:
  - The RFI process has identified areas of groundwater contamination and these areas are known before any construction would be completed in those areas. WZ has a permit system construction workers would use before beginning. Construction workers would have warning of potential exposure before beginning the work and could take appropriate precautions.
  - Groundwater contamination was identified and evaluated as part of the facility RFI work. Within the facility screening level RBSLs have been approved, but a full risk assessment has not been completed. Based on an RBSL of 10-4 (HI=1) only 5 chemicals in 12 different locations have been identified as groundwater contamination. For those 12 different locations an average of the contamination level in each SWMU or AOC was completed and only 2 chemicals in 4 locations showed the average concentration to be above the RBSL. That contamination is discussed as follows:
    - The average ammonia concentration in ground water in AOC 4 was 388 mg/L compared to the RBSL of 307 mg/L. The average ammonia concentration in SWMU 58 was 415 mg/L. Both of these averages are only slightly above the screening levels and are assumed to not be significant when a risk assessment is complete, based on an extrapolation of the pond human health

risk assessment. Both of these areas are known and identified and WZ has a permit system construction workers would use before beginning and work. This permit system would require proper personal protective equipment be worn, should work in the contaminated area be required.

- SWMUs 27 and 38 show average iron concentrations in ground water to be slightly above the RBSLs. These are not considered significant based on an extrapolation of the pond human health risk assessment. Both of these areas are known and identified and WZ has a permit system construction workers would use before beginning and work. This permit system would require proper personal protective equipment be worn, should work in the contaminated area be required.

2. Exposure of site workers to surface soils. Exposure of site workers to contaminated surface soils is not considered significant based on the following:
  - SWMUs and AOC's with surface soil contamination are not part of any working area, workers only enter those areas occasionally and only for short periods of time. The pathway may be complete on occasion, but the exposure time is not significant.
  - No significance ( $HI < 1$  and cancer risk  $< 1E-04$ ) was found in the risk assessment for exposure of current workers to surface soil.
3. Exposure of construction workers to surface soils. Exposure of construction workers to surface soils is not considered significant based on the following:
  - No construction work is being completed in the SWMU/AOC's with surface soil contamination.
  - WZ's has a permit system to control work within the facility and would make construction workers aware of contamination if work was completed in those areas and workers could take proper precautions.
4. Exposure of trespassers to surface soils. Exposure of Trespassers to contaminated surface soil was evaluated as part of WZ's Human health risk assessment completed by URS. That evaluation showed that surface soil alone did not pose a significant risk to trespassers where a pathway existed. The risk assessment did indicate that a combination of surface soil and surface water may pose a cancer risk of  $2E-6$ , however for this assessment that risk would have to be a combined risk (not an individual risk) and would be still less than a  $1E-4$  risk and therefore is not considered significant.
5. Exposure of site workers to contaminated surface water is not considered significant. There was no surface water contamination identified as part of the facility RFI. Some surface water contamination was identified for the Pond RFI. The Pond Human Health Risk Assessment evaluated the risk of site workers to contaminated surface water and did not find any areas of significance because direct exposure to water in the evaporation ponds was considered to be an incomplete pathway for current workers. Therefore, exposure of site worker to contaminated surface water is not considered significant.
6. Exposure of trespasser to contaminated surface water is not considered significant. The only pathway identified for trespasser and surface water was part of the Pond Human Health Risk Assessment. That evaluation showed that surface water alone did not pose a significant risk to trespassers where a pathway existed. The risk assessment did indicate that a combination of surface soil and surface water may pose a cancer risk of  $2E-6$ , however for this assessment that risk would have to be a combined risk and would be still less than a  $1E-4$  risk and therefore is not considered significant.
7. Exposure of construction workers to subsurface soil contamination is not considered significant. This is due to the fact that no known construction has taken place in areas of subsurface soil contamination. Also if construction were to occur, WZ has a permitting system in place that would identify that contamination and would ensure precautions are taken.



8. Exposure of worker to contaminated outdoor air is not considered significant. This is due to the fact that the pond human health risk assessment states "Ammonia in air volatilizing from evaporation pond water does not pose an unacceptable threat to current workers.
  9. Exposure of trespassers to contaminated outdoor air is not considered significant. This is due to the fact that the exposure of potentially contaminated outdoor air to trespassers occurs from the exposure of air borne dust particles to trespassers. This is discussed in the Pond Human Health Risk Assessment. The risk assessment indicates that the cancer risk from surface soil was  $1E-06$  (which is not significant); therefore the exposure to this dust is also considered to be not significant.
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<sup>4</sup> If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

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\_\_\_\_\_ If yes (all “significant” exposures have been shown to be within acceptable limits) - continue and enter “YE” after summarizing and referencing documentation justifying why all “significant” exposures to “contamination” are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

\_\_\_\_ If unknown (for any potentially “unacceptable” exposure) - continue and enter “IN” status code

[illegible]

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6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

  X   YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the \_\_\_\_\_ facility, EPA ID # \_\_\_\_\_, located at \_\_\_\_\_ under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

       NO - "Current Human Exposures" are NOT "Under Control."

       IN - More information is needed to make a determination.

Completed by (signature) Jim Lansbarkis Date 9-8-05  
(print) Jim Lansbarkis  
(title) Environmental Health Scientist

Supervisor (signature) Brad Maulding Date 9-8-05  
(print) Brad Maulding  
(title) Hazardous Waste Facilities Section Manager  
(EPA Region or State) Utah

**Locations where References may be found:**

Utah Department of Environmental Quality, Division of Solid and Hazardous Waste  
288 North 1460 West, Salt Lake City, UT 84116  
(mailing address) P.O. Box 144880, Salt Lake City, UT 84114 -4880

**Contact telephone and e-mail numbers**

(name) Jim Lansbarkis, Brad Maulding  
(phone #) (801) 538-6170  
(e-mail) [jlansbarkis@utah.gov](mailto:jlansbarkis@utah.gov), [bmaulding@utah.gov](mailto:bmaulding@utah.gov).

**FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.**

8-31-05

**Human Health EI Evaluation Table**

This evaluation is to identify any SWMU/AOC in the facility RFI work that shows contamination about the background and the lower of the worker RBSL using  $10^{-4}$  and  $HI=1.0$ . Average SWMU contamination is also evaluated and areas where the Average SWMU concentration is greater than the RBSL is shown in bold. For facility use Preliminary data report

**Groundwater:**

Chemicals	SWMU	High Well or Boring	Highest conc	Avg SWMU Conc	RBSL	units	Highest Pond Conc
Ammonia	AOC 2	M1 & M5	1100	287	307	mg/l	23000
Ammonia	AOC 4	A1 A4	1400	<b>388</b>	307	mg/l	23000
Ammonia	AOC 5	A3	440	140	307	mg/l	23000
Ammonia	54	M4	340	176	307	mg/l	23000
Ammonia	58	A14	610	<b>415</b>	307	mg/l	23000
Cadmium	AOC1	Pi3	430	61	373	ug/l	710
Iron	AOC1	SB2	2,700,000	294,113	2,271,111	ug/l	780000
Iron	27	SB2 SB5	5,400,000	<b>2,867,433</b>	2,271,111	ug/l	780000
Iron	37/57	SB1	4,500,000	1,755,133	2,271,111	ug/l	780000
Iron	38	SB1	3,200,000	<b>2,850,000</b>	2,271,111	ug/l	780000
Zirconium	AOC1	Pi3	460,000	51,044	61,566	ug/l	580000
Chlorform	AOC5	A3	2100	313	584	ug/l	1700

**Surface Soils:**

Chemical	SWMU	Location id	Highest conc	Avg SWMU Conc	RBSL	units	Highest Pond Conc
Arsenic	10	SS3	96	37	85	mg/kg	19
Hafnium	10	SS1	800	256	619	mg/kg	20
Hafnium	58	SB1	2000	<b>1850</b>	619	mg/kg	20
Lead	27	SS3	1300	190	650	ug/g	21
Zirconium	2, 21, 48	SS4, SS5, SS6	3500	<b>1787</b>	1548	mg/kg	360
Zirconium	10	SS1, SS2	4000	1453	1548	mg/kg	360
Zirconium	20	SB3	1600	545	1548	mg/kg	360
Zirconium	22	SS3	2500	1230	1548	mg/kg	360
Zirconium	26	SB2	9600	<b>5010</b>	1548	mg/kg	360
Zirconium	27	SB1, SS2, SS3, SS4	36000	<b>5376</b>	1548	mg/kg	360
Zirconium	49	SS1	9600	<b>9600</b>	1548	mg/kg	360
Zirconium	61	SS1	4200	<b>2515</b>	1548	mg/kg	360
Zirconium	52	SS1	8900	<b>2985</b>	1548	mg/kg	360
Zirconium	AOC12	SB1	1800	1500	1548	mg/kg	360
Zirconium	58	SB1	67000	<b>48500</b>	1548	mg/kg	360
Zirconium	AOC14	SS1	7100	<b>4015</b>	1548	mg/kg	360
Radium 226	2, 21, 48	SS6	2.56±.43	1.8	2.3	pCi/g	12.3
Radium 226	20	SB1, SB2, SB3	4.5±.62	<b>4.15</b>	2.3	pCi/g	12.3
Radium 226	26	SB1, SB2	50.1±5.3	<b>26.18</b>	2.3	pCi/g	12.3
Radium 226	27	SB1, SB3, SB4	7.13±.84	<b>2.74</b>	2.3	pCi/g	12.3
Radium 226	52	SS1, SS2, SS3, SS4	63.8±6.6	<b>35.2</b>	2.3	pCi/g	12.3
Radium 226	58	SB1	8.4±1.1	<b>7.88</b>	2.3	pCi/g	12.3
Radium 226	62	TR3	4.73±.64	<b>2.37</b>	2.3	pCi/g	12.3
Radium 228	27	SB1	13.5±1.7	3.68	4.1	pCi/g	6.38
Radium 228	26	SB1, SB2	47.6±5	<b>26.9</b>	4.1	pCi/g	6.38

Radium 228	52	SS1, SS2, SS3, SS4	19.2±2.2	10.6	4.1	pCi/g	6.38
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<b>Sediment:</b>				<b>Avg</b>			<b>Highest</b>
<b>Chemical</b>	<b>SWMU</b>	<b>Location id</b>	<b>Highest conc</b>	<b>SWMU Conc</b>	<b>RBSL</b>	<b>units</b>	<b>Pond Conc</b>
Hafinium	58	SD1	2000	2000	619	mg/kg	9000
Zirconium	58	SD1	67000	67000	1548	mg/kg	220000
Zirconium	AOC15	SD1, SD4, SD7	6800	2546	1548	mg/kg	220000
Radium 226	10	SD1	3.13±.54	3.13	2.3	pCi/g	59.7
Radium 226	58	SD1	8.4±1.1	8.4	2.3	pCi/g	59.7
Radium 226	AOC15	SD4, SD5, SD6, SD7	8.3±1.1	3.44	2.3	pCi/g	59.7
Radium 228	58	SD1	4.97±.81	4.97	4.1	pCi/g	28.4
Radium 228	AOC15	SD4	6.2±.86	2.43	4.1	pCi/g	28.4
Hexachlorobenzene	58	SB1	360000	360000	119700	ug/kg	340000

<b>Subsurface soil:</b>				<b>Avg</b>			
<b>Chemical</b>	<b>SWMU</b>	<b>Location id</b>	<b>Highest conc</b>	<b>SWMU Conc</b>	<b>RBSL</b>	<b>units</b>	
Hafinium	1	TR2	700	182	619	mg/kg	
Zirconium	2	S2-TR1	2000	332	1548	mg/kg	
Zirconium	60	TR2	24000	8168	1548	mg/kg	
Ammonia	58	SB1	940	665	469	mg/kg	
Radium 226	1	TR2	4.69±.71	2.3	2.3	pCi/g	
Radium 226	2	S2-TR1	2.64±.39	1.68	2.3	pCi/g	
Radium 226	60	TR2	2.52±.57	1.79	2.3	pCi/g	
Radium 226	10	SB1	2.88±.47	2.17	2.3	pCi/g	
Radium 226	20	SB1,SB2,SB3, SB4	3.81±.54	2.86	2.3	pCi/g	
Radium 226	26	SB1, SB2	4.09±.63	3.43	2.3	pCi/g	
Radium 226	27	SB1, SB3, SB4, SB5	3.17±.44	2.33	2.3	pCi/g	
Radium 226	9	SB1	3.25±.52	2.37	2.3	pCi/g	
Radium 226	37	SB1	2.37±.39	1.82	2.3	pCi/g	
Radium 226	38	SB1	2.35±.35	2.01	2.3	pCi/g	
Radium 226	45	SB1	2.61±.51	2.21	2.3	pCi/g	
Radium 228	27	SB1	4.73±.87	3.07	4.1	pCi/g	
Radium 228	38	SB1	5.4±.85	3.4	4.1	pCi/g	

wells in avg

A5, A6, M1,M2, M3, M4 M5, M6, M7, M8  
A1, A2, A5, A6, A11, M1,M2, M3, M4 M5, M6, M7, M8, SWMU17 SB1GB  
A3, A4, A16, A20, AOC5sb1,SWMU9sb1,SWMU45sb1, SWMU50sb1  
M4, M6  
A14, A15  
Pi1, Pi3, Pi5, Pi6, Pi7, Pi8, AOC1SB1, AOC1sb2, AOC1sb3, AOC1sb4  
Pi1, Pi3, Pi5, Pi6, Pi7, Pi8, AOC1SB1, AOC1sb2, AOC1sb3, AOC1sb4  
A17, SWMU27sb2,SWMU5b5  
A18, SWMU27sb2, SWMU5b1  
SWMU38 SB1, SWMU38SB1 dup  
Pi1, Pi3, Pi5, Pi6, Pi7, Pi8, AOC1SB1, AOC1sb2, AOC1sb3, AOC1sb4  
A3, A4, A16, A20, AOC5sb1,SWMU9sb1,SWMU45sb1, SWMU50sb1

**Locations in average**

Sb1 (0-1), ss1, ss2, ss3, ss4  
Sb1 (0-1), ss1, ss2, ss3, ss5  
Sd1, SB1  
SB1, SB2, SB3, SB4, SB5, SS1, SS2, SS3, SS4  
SS1, SS2, SS3, SS4, SS5, SS6, SS7  
Sb1 (0-1), ss1, ss2, ss3, ss5  
SB1, SB2, SB3, SB4  
SS1, SS2, SS3  
SB1, SB2  
SB1, SB2, SB3, SB4, SB5, SS1, SS2, SS3, SS4  
SS1  
SS1, SS2  
SS1, SS2, SS3, SS4  
SB1, SB1 DUP  
Sd1, SB1  
SS1, SS2  
SS1, SS2, SS3, SS4, SS5, SS6, SS7  
SB1, SB2, SB3, SB4  
SB1, SB2  
SB1, SB2, SB3, SB4, SB5, SS1, SS2, SS3, SS4  
SS1, SS2, SS3, SS4  
Sd1, SB1  
TR3 (.5'), TR3 (1'), TR3dup (1')  
SB1, SB2, SB3, SB4, SB5, SS1, SS2, SS3, SS4  
SB1, SB2

SS1, SS2, SS3, SS4

**Locations in average**

SD1  
SD1  
SD1, SD2, SD3, SD4,SD5, SD5dup, SD6, SD7  
SD1  
SD1  
SD1, SD2, SD3, SD4,SD5, SD5dup, SD6, SD7  
SD1  
SD1, SD2, SD3, SD4,SD5, SD5dup, SD6, SD7  
SD1

**Locations in average**

TR1(8'), TR2(12'),TR3(10'),TR4(10')  
TR1(3'), TR1(10'),TR2(10'), TR3(7'), TR4(6'), TR5(8'), TR6(5')  
TR1, TR2, TR3  
SB1(.5-2.5'), SB1,(2.5-4.5)  
TR1(8'), TR2(12'),TR3(10'),TR4(10')  
TR1(3'), TR1(10'),TR2(10'), TR3(7'), TR4(6'), TR5(8'), TR6(5')  
TR1, TR2, TR3  
SB1(1-3'), SB1(3-5'),SB1(5-7'),SB1(7-9')  
SB1(1-3'), SB1(5-7'), SB1(7-9'),SB2(1-3'), SB2(3-5'), SB2(5-7'), SB3(1-3'), SB3(3-5'),SB3(5-7')  
SB1(2-4'),Sb1dup(2-4), SB1(4-6'), SB2(1-3'), Sb2(7-9')  
SB1(1-3'), SB1(3-5'),SB1(5-7'),SB2,(1-3'), SB2dup(1-3'), SB2(3-5'), SB2(5-7'), SB3(5-7'), SB3(7-9')  
SB1(5-7'), SB1(7-9'), Sb1(9-11')  
Sb1(1-3'), SB1dup(1-3'), SB1(3-5'), SB1(5-7'), SB1(7-9'), SB1(9-11'), SB2(1-3'), SB2(3-5'), SB2(5-7'), SB3(1-3'), SB3(3-5'), SB3(5-7')  
SB1(5-7'),SB1(7-9'), SB1(9-11'), SB1(11-13')  
SB1(.5-2.5'), SB1(9-11'), SB1(11-13')  
SB1(1-3'), SB1(3-5'),SB1(5-7'),SB2,(1-3'), SB2dup(1-3'), SB2(3-5'), SB2(5-7'), SB3(5-7'), SB3(7-9')  
SB1(5-7'),SB1(7-9'), SB1(9-11'), SB1(11-13')

i-7'

B4(3-5'), SB4(5-7'),

SB2(10-12')

B4(3-5'), SB4(5-7'),